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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/715,407	11/19/2003	Martin A. Lee	1498-164	5324
23117	7590	08/30/2006	EXAMINER	
NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203			WHISENANT, ETHAN C	
			ART UNIT	PAPER NUMBER
			1634	

DATE MAILED: 08/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/715,407

Applicant(s)

LEE ET AL.

Examiner

Ethan Whisenant, Ph.D.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 June 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 17-19, 21-24 and 27-31 is/are rejected.
- 7) ☒ Claim(s) 20, 25 and 26 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 NOV 03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 09/786,521.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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NON-FINAL ACTION

1. The applicant's response (filed 16 JUN 06) to the Office Action has been entered. **Claim(s) 17-31** is/are pending. Rejections and/or objections not reiterated from the previous office action are hereby withdrawn. The following rejections and/or objections are either newly applied or reiterated. They constitute the complete set presently being applied to the instant application.

35 USC § 112- 2nd Paragraph

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

CLAIM REJECTIONS under 35 USC § 112- 2ND PARAGRAPH

3. **Claim(s) 23 and 31** is/are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 23 is indefinite because the phrase "the strands" lacks proper antecedent basis in Claim 17 and /or Claim 21.

Claim 31 is indefinite in that it uses the phrase "wherein the length of the temperature probe sequence is similar to." The phrase "similar to" is relative and therefore the metes and bounds of what is intended is impossible to determine.

35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. § 103, the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligations under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of potential 35 U.S.C. § 102(f) or (g) prior art under 35 U.S.C. § 103.

CLAIM REJECTIONS UNDER 35 USC § 103

6. **Claim(s) 17-19, 21-24, and 27-31** is/are rejected under 35 U.S.C. 103(a) as being unpatentable over Tyagi et al. [US 5,925,517 (1999)] in view of Livak et al. [US 5,736,333(1998)].

Claim 17 is drawn to a method of monitoring the temperature of a biochemical reaction in a reaction mixture.

Tyagi et al. teach a method which utilizes a fluorescently labelled temperature probe DNA sequence as recited in Claim 17. Note especially Figures 11 and 14. The teachings of Tyagi et al. make clear that the temperature of a reaction mix can be monitored as a function of increasing/decreasing fluorescence. Admittedly, Tyagi et al.

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do not explicitly teach monitoring the temperature of a biochemical reaction using their probes. However, Livak et al. provides evidence that it was well known in the art at the time of the invention to monitor the temperature of a biochemical reaction (i.e. PCR). See at least, for example, Column 1, beginning at line 33- Column 2, line 3. Therefore, absent an unexpected result, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Tyagi et al. wherein their probe system is used to monitor the temperature of a biochemical reaction (i.e. PCR). The ordinary artisan would have been motivated to modify Tyagi et al. with Livak et al. to arrive at the claimed invention in view of at least Figures 11 and 14 of Tyagi et al. wherein it is readily apparent that temperature can be monitored as a function of increasing/decreasing fluorescence of the biochemical reaction.

Claim 18 is drawn to an embodiment of the method of Claim 17 wherein the temperature probe DNA sequence comprises a labelled double stranded DNA sequence.

Tyagi et al. teach this limitation see, at least, for example, Figures 1-5.

Claim 19 is drawn to an embodiment of the method of Claim 17 wherein the temperature probe DNA sequence comprises a single nucleic acid strand, the end regions of which hybridize together so as to form a loop or "hairpin" structure.

Tyagi et al. teach this limitation see, at least, for example, Figures 3-5.

Claim 21 is drawn to an embodiment of the method of Claim 17 wherein the fluorescent label used in the method employs fluorescence transfer (FRET) as the basis of the signal.

Tyagi et al. teach this limitation wherein these authors teach, "For example, referring to FIGS. 1 and 2, the preferred label moieties are a FRET pair."

Claim 22 is drawn to an embodiment of the method of Claim 21 wherein the temperature probe DNA sequence is provided with a reporter and a quencher molecule, arranged so that the hybridization of the strands alters the spatial relationship between the reporter and a quencher molecule.

Tyagi et al. teach this limitation wherein these authors teach : "Utilizing fluorescent and quencher moieties in this manner, the probe is only "on" in the "open" conformation and indicates that the probe is bound to the target by emanating an easily detectable signal. The conformational state of the probe alters the signal generated from the probe by regulating the interaction between the label moieties."

Claim 23 is drawn to an embodiment of the method of Claim 22 wherein the temperature probe sequence is a single stranded sequence, where the end portions hybridize together and wherein the reporter molecule is attached in the region of either the 5' or 3' end of the sequence and the quencher molecule is attached at the opposite end .

Tyagi et al. teach this limitation see for example Figures 1-5

Claim 24 is drawn to an embodiment of the method of Claim 22 wherein the reporter and quencher molecules are located on different strands of a DNA temperature probe sequence such that on hybridization of the strands, they are brought into close proximity to each other.

Tyagi et al. teach this limitation see for example Figure 1.

Claim 27 is drawn to an embodiment of the method of Claim 17 wherein the pre-determined temperature at which the DNA sequence denatures is determined by the length of the temperature probe sequence.

Tyagi et al. teach this limitation wherein these authors teach "One skilled in the art will realize that these parameters will vary with the conditions of the hybridization assay and that those conditions must be considered when designing the nucleic acid

sequences of probes of this invention. Put another way, the probe must be constructed to function as described above under the conditions of the assay in which it is to be used in order to be a probe according to this invention. A particular construction may be a probe according to this invention under one set of assay conditions but not under another set of assay conditions. The length of the arms and their guanosine-cytidine content affect the melting temperature of a stem duplex.

For a desired melting temperature, under particular assay conditions, a length and a guanosine-cytidine content of the arms can easily be calculated by those skilled in the art. The melting temperature of the duplex stem of a probe can be empirically determined for given assay conditions using the methods described below in Example V. “

Claim 28 is drawn to an embodiment of the method of Claim 17 wherein the pre-determined temperature at which the DNA sequence denatures is determined by the GC content of the sequence.

Tyagi et al. teach this limitation wherein these authors teach “One skilled in the art will realize that these parameters will vary with the conditions of the hybridization assay and that those conditions must be considered when designing the nucleic acid sequences of probes of this invention. Put another way, the probe must be constructed to function as described above under the conditions of the assay in which it is to be used in order to be a probe according to this invention. A particular construction may be a probe according to this invention under one set of assay conditions but not under another set of assay conditions. The length of the arms and their guanosine-cytidine content affect the melting temperature of a stem duplex.

For a desired melting temperature, under particular assay conditions, a length and a guanosine-cytidine content of the arms can easily be calculated by those skilled in the art. The melting temperature of the duplex stem of a probe can be empirically determined for given assay conditions using the methods described below in Example V. “

Claim 29 is drawn to an embodiment of the method of Claim 17 wherein wherein the biochemical reaction is an amplification reaction.

Livak et al. teach this limitation. See at least, for example, Column 1 , beginning at line 33- Column 2, line 3.

Claim 30 is drawn to an embodiment of the method of Claim 17 wherein the biochemical reaction is an amplification reaction.

Livak et al. teach this limitation. See at least, for example, Column 1 , beginning at line 33- Column 2, line 3.

Claim 31 is drawn to an embodiment of the method of Claim 17 wherein the biochemical reaction is an amplification reaction.

Tyagi et al. teach this limitation. See at least, for example, Figures 1 and 2. Please note that this rejection is made in view of the ambiguity of the phrase "is similar to"

RESPONSE TO APPLICANT'S AMENDMENT AND/OR ARGUMENTS

9. Applicant's arguments with respect to the claimed invention have been fully and carefully considered but are moot in view of the new ground(s) of rejection. Please note that the Terminal Disclaimer filed 16 JUN 06 has been entered Accordingly, the Double Patenting rejection(s) applied against the instant invention in the Office Action mailed 21 APR 06 have been withdrawn.

CLAIM OBJECTIONS

7. **Claim(s) 20, 25-26** is/are objected to because it/they is/are dependent upon a rejected independent base claim.


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CONCLUSION

8. **Claim(s) 17-31** is/are rejected and/or objected to for the reason(s) set forth above.

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ethan Whisenant, Ph.D. whose telephone number is (571) 272-0754. The examiner can normally be reached Monday-Friday from 8:30AM - 5:30PM EST or any time via voice mail. If repeated attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ram Shukla, can be reached at (571) 272-0735.

The Central Fax number for the USPTO is (571) 273-8300. Please note that the faxing of papers must conform with the Notice to Comply published in the Official Gazette, 1096 OG 30 (November 15, 1989).



ETHAN WHISENANT
PRIMARY EXAMINER

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